

OPERATIVE TREATMENT OF EXOPHTHALMIC GOITRE.

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IN reporting the following two cases of exophthalmic goitre, it is not proposed to draw from them any very broad generalizations, but to bring forward whatever of interest they possess, in the hope that in a subject where the indications for surgical interference are still indefinite even such isolated observations may be of value. Individually, the cases present some unusual features worthy of note, which shall be the writer's excuse for reporting them in detail: the one, the development of severe Basedow symptoms after a course of thyroid extract, a rapid development of a cyst in the remaining half of the gland after a unilateral thyroidectomy, with recurrence of the nervous symptoms, transitory myxœdema after a second operation, with eventual relief; the other presenting universal non-pitting œdema unaffected by a short administration of thyroid extract, by which, however, the nervous symptoms were markedly increased, the whole clinical complex being altered and relieved by enucleation of a large encapsulated thyroid adenoma. In both cases the symptoms of Graves's disease were secondary to the appearance of the goitre.

If a word may be said of the operative treatment of exophthalmic goitre in general, and the indications for its employment, the following is offered as representing the consensus of opinion of the more broadly conservative surgeons at the present time, viz., that, with the obvious exception of the few cases in which the indications for operation are absolute (as when the tumor produces dangerous compression of the trachea), patients suffering from exophthalmic goitre

should be subjected to operation only after reasonable trial of medical treatment has been made and failed. However, as knowledge of the relation of the goitre to the symptoms increases and the technique of operation is developed, the limits of usefulness of operation will be better determined, and it is probable that a larger and larger proportion of cases will be successfully treated surgically. At least a review of the literature of the subject of the last few years seems to warrant that expectation. The reason for this conservative position of surgery at the present time is, in addition to recognition of the real value of medical treatment, in which should be included mental and bodily rest, the universal experience that operation on patients suffering with exophthalmic goitre is attended with grave danger. Furthermore, it has been shown that this danger is especially great in acute cases, and somewhat in proportion to the severity of the nervous symptoms. It would seem, then, that operation is pretty definitely contra-indicated in severely acute cases and in acute exacerbations of chronic cases. Since acute attacks of exophthalmic goitre have many times been reported as having followed severe nervous shock of mental strain, and since it is commonly found that severe strain, mental or physical, will increase the nervous symptoms in most cases of exophthalmic goitre, it is reasonable to suppose that the inevitable mental excitement attendant upon undergoing a serious surgical operation is in itself enough to greatly aggravate the nervous symptoms. For this reason, when operation is proposed in a given case, it is advised to choose for the time of operation a period of quiescence rather than to operate during an exacerbation of the nervous symptoms. To the same end, in an acute case, some advantage may be gained by taking time to prepare the patient for operation by a period of as complete physiological rest as possible. The heart should be carefully studied, and operation not deferred too long in cases where the heart action grows progressively weaker.

The anæsthetic further adds to the danger. In fact, Kocher looks upon the anæsthetic as the greatest danger in

operation in such cases. Under the anæsthetic the rapidity of the heart action is further increased, and often to an alarming extent. Some years ago the writer gave the anæsthetic in an operation by Dr. Lane, of San Francisco, of enucleation of a cystic goitre with signs of Graves's disease, though without noticeable exophthalmos. Billroth's A. C. E. mixture was used, but sparingly, however, for the patient was greatly depressed by it, and the pulse-rate, which had been about 120, rapidly increased to 140, which it maintained throughout the operation. Within twenty-four hours it had increased to 180, and soon to 200 and 260. The heart finally beat itself out, and the patient died within forty-eight hours of the time of the operation. Because of the danger of general anæsthesia, Kocher operates with no other anæsthetic than a small injection of cocaine into the skin, claiming that little pain is caused by the work in the deeper tissues.

Depending comparatively little on what operation is done, the symptomatic rapidity of heart action is invariably increased even independently of the anæsthetic. By those who follow the theory of Moebius of hyperthyroidism, this exaggeration of the nervous symptoms following operation is usually accounted for by supposing that the manipulation of the gland sets free a large amount of thyroid secretion which finds its way into the circulation. In both the cases here reported operation was followed by marked exaggeration of the tachycardia, the tremor and the sweating, although no anæsthetic was used beyond a few minims of a weak solution of cocaine in the skin.

It is on this ground that attempts have been made to destroy portions of the thyroid gland with a minimum of manipulation such as Jaboulay's exothyropexie, an operation which has not given satisfactory results, and which one would suppose to be extremely dangerous from inevitable infection, against which patients suffering with exophthalmic goitre have very little resistance. Ligation of the thyroid arteries, formerly done by Wölfler in ordinary goitre, has been revived and applied to exophthalmic goitre, and is being done by Kocher

and others for the purpose of causing atrophy of the gland. It has been found that ligation of one artery is not sufficient to produce any marked effect, and to ligate all four of the main arteries while it does not produce gangrene of the thyroid is apt to be followed by myxœdema. From a technical stand-point, it is difficult to see that the ligation of both superior and one inferior thyroid arteries is a much simpler operation than partial thyroidectomy, and it must entail more or less manipulation of the gland.

The operations on the cervical sympathetic nerves as performed chiefly by Jaboulay and Jonnesco have not met with very wide-spread favor. Although a number of apparently successful cases have been reported, they are too few to be the basis of final verdict in regard to the value of the procedure. The operation of Jonnesco, in which the greater part of the cervical sympathetic is removed with the third ganglion, is attended with serious technical difficulties. The operation seems to have its greatest usefulness in lessening the exophthalmos; and some have suggested that the diminution in the size of the goitre as reported may possibly be accounted for by ligation of the vessels in the dissection (Freiherr v. Eiselsberg), but cases have been reported where the operation has been performed through an incision posterior to the sternocleidomastoid muscle, which would be completely posterior to the vessels. Mariani, who reports a remarkably favorable result from the bilateral operation, looks upon the procedure not as attacking the primary seat of the disease, but as purely symptomatic in destroying a portion of the mechanism by which certain symptoms of the disease are produced.

By far the greater number of surgeons reporting results of operation in exophthalmic goitre favor the operation of partial thyroidectomy. Mikulicz would consider it the normal procedure, to be modified according to the peculiarities of individual cases. The results of partial thyroidectomy have materially improved in later statistics, largely by reason of the more intelligent selection of cases, selection of favorable moment for operation, the abolition of general anæsthetic and

avoidance of undue manipulation of the gland, and, as advised by Moebius, division of the isthmus with thermocautery or searing the cut surface. Starr's statistics, 1896, of 190 cases showed a mortality of 12 per cent.; Kinnicutt's of the same year, 187 cases, with mortality of 7 per cent., and Rehn's, 1899, 13.6 per cent., with mortality, after ligation, of 48 per cent. Several reports of considerable series have been made in the last two years which are much more favorable. Schulz (*Beiträge zur klinischen Chirurgie*, Band xxx) reports twenty cases of partial thyroidectomy (including enucleation of adenomata) without a death, although chloroform was used. Of these eighteen were traced, and all but one were either cured or very greatly improved, although fourteen were bad cases. Wilmer (*Beiträge zur klinischen Chirurgie*, Band xxix) reports twenty-three cases of exophthalmic goitre treated by operation, nineteen being resections, three enucleations, and two ligations of the thyroid vessels with two deaths. All were followed but one. In eighteen the result was satisfactory, and there were two failures. Reinbach (*Mittheilungen aus dem Grenzgebiet der Medicin und Chirurgie*, Band vi), studying eighteen cases operated on by Mikulicz, reports twenty-one operations, sixteen being resections without a death, and five ligations with one death. Of the eighteen cases twelve were completely cured, nine being traced from four to nine years, and three more than one year, and three cases were greatly improved. In only one case was there a recurrence. Taking these three groups of cases of operation on the thyroid together, there are sixty-five operations (resections, enucleations, and ligations of vessels) with three deaths,—a percentage of 4.6 per cent. Fifty-eight patients were traced, of whom forty-seven (81 per cent.) were cured or had satisfactory result, three were improved, and four (7 per cent.) failures or had recurrence.

In 230 cases of partial thyroidectomy collected by Ehrhardt (*Handbuch der praktischen Chirurgie*, 1900), 45 per cent. were cured, 23 per cent. greatly improved, 11 per cent. slight improvement, in 10 per cent. failures, and in 7.5 per

cent. deaths. The cases were not separated into genuine and secondary forms, and the results are no improvement on older statistics.

Since the above was written, an elaborate article on the subject of the operative treatment of exophthalmic goitre has been published by Dr. Albert Kocher (*Mittheilungen aus dem Grenzgebiet der Medicin und Chirurgie*, 1902), in which a most painstaking review is made of all the cases occurring in Professor Kocher's clinic in Bern. The report gives in detail the histories of ninety-three cases: fifty-nine were operated on, of which thirty-seven were severe and twenty-two moderately severe cases or with one or more symptoms lacking. Forty-five, or 76 per cent., remained cured; eight, or 14 per cent., were definitely improved; two, or 3.3 per cent., slightly improved, and four, or 6.7 per cent., died. On the basis of the results of operation in these fifty-nine cases, Kocher makes a strong plea for the operative treatment of exophthalmic goitre.

CASE I.—Miss M. A., aged thirty-one years, entered hospital January 4, 1900. Her mother, aged sixty-one years, had had a large cystic goitre since girlhood, but with no Basedow symptoms beyond general nervousness and insomnia. This cyst was ruptured by a fall, and the fluid was absorbed and did not reaccumulate. Patient's grandmother on her father's side had goitre. Patient's goitre was first noticed when she was twelve years of age. It continuously increased in size, slowly at first, rapidly during the last seven years. About 1892 patient began to be troubled with shortness of breath. In 1895 had an attack thought to be dysentery. In 1897 she weighed 145 pounds, and was advised to try thyroid extract for the goitre. She took five grains twice daily in periods of two weeks at two weeks' intervals for some months. The weight steadily decreased at the rate of five pounds a month until she weighed 115 pounds, the goitre remaining unchanged. She was given *fucus vesiculosus*, and then potassium iodide in large doses, with no beneficial effects. Beginning in 1895, she had had paroxysms of severe pain in the right side in the region of the liver, gradually increasing in frequency and severity and duration, coming on chiefly at night. In these attacks, the pain

would be preceded by a period of increased cardiac activity and shortness of breath. The pain would begin as a dull ache, and gradually reach a maximum, radiating over the abdomen, back, and right shoulder, and slowly subside, leaving the right side sore and tender. Jaundice was never observed. In 1899, following prolonged over-work, these attacks became so frequent and severe that she was obliged to give up her work. The condition improved for a time under complete rest, but the attacks recurred with increased severity. Vomiting and excessive perspiration were added. There was no disorder of menstruation beyond pain. She had for years very little use of her voice beyond the needs of conversation, and for two years was unable to make more than slight physical effort without great shortness of breath. She was sent to the writer by Dr. W. F. Cheney, of San Francisco, for operation, he having made the diagnosis of Graves's disease with compression of the trachea. This latter gave absolute indication for operation, and the occurrence of a paroxysm of pain of unusual severity, lasting four days, during which her parents all but despaired of her life, decided the matter with the patient.

Status.—Slight young woman, weighing 100 pounds, presented nearly uniform enlargement of the thyroid, the left side a little larger and extending into the ring of the first rib; dyspnoea considerable, even at rest; respiration noisy from stenosis. Pressure on the tumor caused almost complete closure of the trachea. The goitre was moderately firm in consistency; no cyst or localized tumor definable, no observable pulsation, moving about three centimetres on deglutition. Patient excessively nervous, restless, with marked tremor, very little exophthalmos (the lid aperture slightly larger than usual). Pulse-rate while at rest in bed, 124 to 130; temperature, 99 to 100.4° F.; pain so great as to prohibit sleep and to require morphine. No jaundice present. Stools normal in color. Entire liver region tender on pressure, moderate spasm of upper abdominal muscles, liver dulness, nine centimetres in mammary line, not extending beyond border of ribs. Under rest in bed for a few days, pulse came down gradually till it ranged from 80 to 100, and the hepatic pain became less, so that patient could sleep at night without opiates.

January 15, with local anæsthesia (Schleich's solution) of the skin, with morphine, one-fourth grain hypodermically, the left

half of the gland with the isthmus was removed. It extended more than three centimetres below the first rib, pressing on the trachea. But three vessels required ligation. The isthmus, which was two centimetres in diameter, was ligated and severed, care being taken to avoid the escape of any of the thyroid matter into the wound, and the cut surface was seared with carbolic acid and wiped with alcohol. The wounds in the muscles and fascia were closed with chromicized catgut, and the skin with subcuticular stitch of fine catgut. Duration of operation, one hour. For perhaps half the time the patient complained bitterly, but more of choking sensation produced by the traction on the tumor than of actual pain.

Dr. Ophuls, pathologist to Cooper College, reported that the structure was that of a normal thyroid gland with a great deal of colloid in the acini.

During the first twenty-four hours after the operation the patient vomited frequently, perhaps because morphine was given three times, though morphine had been given before the operation without nausea. The pulse was very rapid and weak, 130 to 140. The patient was delirious part of the night, and urinated involuntarily for three days. A few hours after the operation the temperature rose to 101.5° F., but subsequently did not rise above 100° , and for three days was from 99° to 100° , reaching 98.4° on the fourth day. For four days after the operation the pulse ranged from 120 to 140, but on the fifth day came down to 84. The wound was dressed on the eighth day; complete primary healing. Left hospital on the tenth day.

Patient remained well and gained rapidly in strength and weight,—twenty pounds in two months,—the pulse ranging from 75 to 85; the right lobe of the thyroid then began to enlarge, and after a day of unusual fatigue and excitement the tremor and the tachycardia returned. The pulse rose to 120. Headache, vomiting, and the hepatic pain came on. After a few days in bed these phenomena subsided, to recur again as the goitre enlarged. On re-entering the hospital in May (four months after the thyroidec-tomy) the pulse ranged from 110 to 120, but after resting in bed for a time went down to from 80 to 100; the temperature, 99° to 100° F. May 29, under chloroform (patient was much less nervous than at the former operation and the heart much stronger), a cyst five by seven by four centimetres was shelled

out from the right half of the thyroid. There was no difficulty in the operation; the chloroform was well borne; few vessels had to be tied. The wound was closed without drainage. Immediately after the operation the pulse was 108 to 120; next day reaching 128, and on the second day 136, after which it gradually went down. On the third or fourth day the patient complained of a feeling of stiffness about the face. There was very definite œdema present of the character of myxœdema. This lasted perhaps a week, and gradually disappeared. The wound was dressed on the sixth day and a little bloody serum evacuated. There was no infection, and the patient left the hospital on the eleventh day. She rapidly improved in general health, and was able to take walks of several miles across country. Her voice became stronger than it ever had been, and she was able to sing in her father's choir, something which she had never been able to do. She felt stronger than for several years.

Recently, two years after the thyroidectomy, she writes that her health has been excellent ever since; that only once, after a severe mental and physical strain, had she had a return of the pain in the right side, but this lasted nearly a week; that she has been teaching school for the last five months, working as she has not been able to work for years. She has gained fifty pounds in weight. Has no nervousness, tremor, or tachycardia.

CASE II.—Mrs. H. O., aged twenty-nine years. Family history negative save distant tuberculosis on the mother's side. She had perfect health till ten years ago, when, at the age of nineteen, she had scarlatina. She has never had other serious illness. She was married a few weeks before the attack of scarlatina, and three months later noticed swelling on the neck on the left side, the size of a walnut. A year later she became pregnant, and noticed that the goitre enlarged rapidly as pregnancy progressed, until at end of term it was the size of a fist. It had slowly increased in size ever since. The labor was protracted, the patient not having strength to expel the child, and forceps had to be used, although the child weighed only six pounds. It died at six months of cerebrospinal meningitis. About this time, *i.e.*, two years after the goitre was first manifest, shortness of breath became distressing. Two years later, or six years, ago, the patient was again pregnant, when the goitre again took on rapid growth. After three months miscarriage occurred. Three or four years

ago her eyes were prominent. At this time the menstruation ceased for two years.

Rapid action of the heart, with periods of palpitation, restlessness, shortness of breath, excessive perspiration, flushing of the face, difficulty in speaking, weakness of voice, general muscular weakness, and diarrhœa characterized the further progress of the disease.

Four years ago the patient noticed feet and legs swelling, at first transitorily, but gradually more and more persistently. The swelling finally reached the abdomen and vulva, so that locomotion became difficult. Patient said that recently even the face and hands have become stiff and rigid from swelling. The swollen parts are numb and cold. The patient has been much troubled with cramps in the legs and arms, and even in the tongue, interfering with speaking. The eyes would at times seem to set so that she could not turn them quickly to look at an object on one side. She complained also of "nervous spells," hot flushes coming on without apparent cause, and with furious perspiration. The patient had no pain beyond an occasional headache, but says the numbness and stiffness in the limbs are very annoying. She is unable to get about and is unable to do her housework, and is so excessively nervous that at times she can scarcely keep from screaming out—"feels as if she were losing her mind."

Status, September 11, 1901.—Large woman, presenting large goitre overhanging sternum in the middle line and extending upward to the left. It was round and smooth, sharply limited, and freely movable. Tremor was marked, fine in character; pulse, 140; respiration, 50; temperature, 99° F. by mouth; weight, 152 pounds. The legs, thighs, vulva, and abdominal walls greatly swollen, livid in color, and of cold, clammy surface. The œdema was not like cardiac or renal œdema, but seemed to be of thicker fluid. It pitted only on very deep and prolonged pressure. The face was thick, the cheeks and eyelids stiff, interfering with articulation and facial expression, the swelling noticeable, and the thickening palpable; the hands swollen and stiff. In an attack of flushing and excessive perspiration, as described above, and due to nervousness from undergoing examination, the respiration became 50 or 60 and pulse 140. Slight cyanosis was evident. Circulation in general sluggish; when blood was pressed out of fingertips it returned slowly. Finger-nails poorly nourished and thin.

Lid aperture rather larger than normal, but otherwise exophthalmos was not definite. Urine gave specific gravity 1017, alkaline reaction, with slight cloud of albumen, no sugar, no cylindroids, a small amount of bladder epithelium, with an occasional pus-cell.

Besides the fine tremor there were choreic movements, and patient stated that the hands were at times so uncontrollable that she had difficulty in getting her fork to her mouth in eating.

While in bed in the hospital the pulse continued high, 110 to 120, and the respirations 46 to 60. Because of the peculiar character of the œdema, thyroid extract, five grains, was given t. i. d. After three days there was no effect on the œdema, but the nervous symptoms were markedly increased, perspiration was extraordinarily profuse, so that the sheets were saturated frequently. Patient became extremely nervous, thrashing from side to side; pulse, 100 to 130; temperature, 98° to 99.5° F.; respiration, 30 to 60.

September 15. Operation.—While being taken to the operating-room the patient's pulse rose to 160 and respiration to 50 from the excitement. Twenty minims of 1 per cent. solution of cocaine were injected into the skin in two lines over the inner edges of the sternocleidomastoid muscles and across above the sternum. After incision in this line and retraction of the depressors of the hyoid, the capsule of the tumor was laid bare and the smooth mass was shelled out without difficulty. There was but little hæmorrhage, readily controlled. The muscular layers and the fascia were closed with catgut, and the skin with subcuticular suture of fine catgut. During the operation the pulse remained high for perhaps half an hour, but at the end of the operation had come down to 80. Patient did not complain at all of pain during the operation, but afterwards said that she had had some pain, but more discomfort from the choking sensation due to the traction on the tumor. Some hours after the operation the pulse rose to 140, temperature 102° F., and respiration 50, and there was very little variation in these figures for three days, when they began to recede, till on the fourth day the pulse and respiration were 95 and 30, respectively, and from then on gradually diminished in frequency. On the fifth day the wound was examined and found completely healed. On the sixth day

patient was out of bed, on the ninth day walked out into the garden, on the tenth day menstruation began, on the eleventh day she left the hospital in the following condition: face flaccid or in normal condition, sense of stiffness gone, articulation unimpeded, œdema gone from abdominal walls and vulva, thighs less tense than before the operation but still hard, circulation improved, perspiration much less, loss of weight thirty pounds, probably mostly œdema, temperature 97.6° to 98° F., pulse 65 to 80, respiration 20 to 25.

After six weeks she returned for observation; gave the appearance of one in good health; had gained twenty pounds in four weeks; feet no longer swollen, face and hands natural; was able to wear gloves two sizes smaller than before the operation; pulse 86, regular; bowels move once or twice a day instead of fifteen or twenty times, as before the operation; no return of excessive perspiration. One day less than seven weeks after the operation, she took a walk to the top of a hill near her home—a climb of nearly a thousand feet in a mile and a half—keeping up with the rest of the party. She found she could lift her legs in climbing over fences, as she had not been able to do for years. The finger-nails show a markedly better nutrition, the newer portions being sharply distinguished by a well-marked ridge, the old nails being about half gone. No enlargement of the thyroid present. The region of the operation soft, the scar scarcely noticeable.

February 26, five months after operation, patient again returned, with pulse 114 and respiration 28, but she had just walked a considerable distance against a strong wind. After sitting a while the pulse subsided to 80. She said she has had no return of the nervous symptoms. She has been inclined to constipation, and has been obliged to take physic; weighs 151 pounds, a gain of thirty pounds since leaving the hospital. The thighs remain quite hard, otherwise no œdema observable; but the patient says her ankles are a little swollen at night. There is no longer abnormal frequency of urination. Menstruation is regular, but at intervals of three weeks. There is no tremor. Patient says that in walking she can use her legs better than in ten years. She is fond of outdoor exercise and takes long walks. On February 20 she walked twenty miles, lugging a bicycle over a muddy road, up and down

hill. She was not troubled with shortness of breath, and did not suffer unusual fatigue afterwards. She has been doing her own housework for four months, including washing and ironing.

April 12, seven months after operation, the condition as last reported is unchanged, save that the œdema is apparently a little less, and she continued to feel stronger and be less nervous.

The goitre was examined by Dr. Ophuls, who reported as follows: "Tumor the size of an orange, with yellowish-brown cut surface, from which a large quantity of colloid is discharged. In spots, small hæmorrhages. The tumor consists of spherical follicles filled with colloid. The thin partitions between consist of fibrous tissue with blood-vessels. In spots, the lymph spaces in the fibrous tissue are much dilated and filled with colloid. Some of the follicles have ruptured and discharged their contents directly into the interstitial connective tissue. Diagnosis, adenoma thyroideæ colloides."

To recapitulate: In both cases the symptoms indicative of Graves's disease were secondary to pre-existing goitre; both cases were chronic and were characterized by increased rapidity of heart action, fine tremor, increased rapidity of respiration, excessive nervous sensibility, diarrhœa, periodical increase of these symptoms, with remissions, constant slight rise of temperature, dyspnœa, general muscular weakness, flushings, and sudden periods of excessive perspiration. In the first case, extraordinary attacks of severe pain in the region of the liver; in the other, a curious, general, non-pitting œdema. In neither case were there characteristic changes in the histological appearance of the tumors. In both cases operation was followed by temporary increase of the nervous symptoms, this followed by gradual remission, the one case having recurrence concomitant with development of a cyst in the remaining portion of the gland, relieved by second operation. No further recurrence of nervous symptoms in either case, the one being observed for two years, the other for seven months.

From the stand-point of technique in the operations, neither case is of any particular interest, save that the opera-

tions were done without anæsthetic beyond the local use of a small amount of cocaine in the skin, and that the suffering caused by the manipulation of the deeper parts was bearable, and due more to interference with the respiration and the sensation of choking caused by traction on the tumor than to severe pain.